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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/606,750	TODA ET AL.	
	Examiner	Art Unit	
	Janis L. Dote	1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 December 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) *24-26* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *1-26* are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 June 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *6/27/03;11/28/03;*6/21/04; 11/26/04; 12/15/04
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

1. This office action is responsive to the response filed on Nov. 23, 2004. Claims 1-26 are pending.

2. Applicants' election with traverse of the invention of Group I, claims 1-23, in the reply filed on Nov. 23, 2004, is acknowledged. The traversal is on the grounds that the office has not shown that the product of Group I can be made by the process as described at pages 2 and 3 of the restriction requirement mailed on Oct. 28, 2004. Applicants further assert that the office has not demonstrated that it would be a serious burden to examine the entire application.

Applicants' arguments are not persuasive. As discussed in the restriction requirement mailed on Oct. 28, 2004, pages 2 and 3, the examiner relied on the disclosure in example 1 at pages 73-74 of the instant specification, to support her assertion that the product of Group I can be made by a process that does not require filtering the charge generation coating liquid as required in the process of Group II. Example 1 of the instant specification makes a photoreceptor comprising an electroconductive substrate having a 10-point surface roughness of 1.0 μm, a charge generation layer comprising a polyvinybutyral binder resin and a titanyl phthalocyanine material, which has an average particle diameter 0.2 μm, and a

charge transport layer formed on the charge generation layer without the use of non-halogenated solvent. The charge transport comprises a charge transport material and a resin. See the instant specification, example 1 at pages 73-75, and Table 2 at page 82, example 1. The photoreceptor made by the method disclosed in example 1 meets the compositional limitations recited in instant claim 1. Accordingly, example 1 of the instant specification shows that the instantly claimed photoreceptor of Group I may be made by the office's alternative process.

Moreover, as set forth in the restriction requirement, the search for the photoreceptors, imaging forming apparatuses, and process cartridges of Group I and the search for the method of making a photoreceptor of Group II are not co-extensive. Searches for the photoreceptors, apparatuses, and process cartridges of Group I do not require a search in the method of making of a photoreceptor subclass 430/134. Nor does a search for the method of making of Group II require a search in the photoreceptor subclass 430/58.7, the apparatus subclass 399/159, and the process cartridge subclass 399/116. Thus, the distinct searches and the distinct issues of patentability establish the burden on the Office.

The requirement is still deemed proper and is therefore made FINAL.

3. Claims 24-26 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicants timely traversed the restriction (election) requirement in the reply filed on Nov. 23, 2004.

4. The examiner has considered only the material submitted by applicants, i.e., copies of the originally filed claims, abstract, and figures of the US application listed in the "List of Related Cases" filed in the Information Disclosure Statement (IDS) on Jun. 21, 2004.

The examiner has considered the US applications listed on the "List of related cases" in the Information Disclosure Statements (IDS) filed on Nov. 26, 2004, and Dec. 15, 2004.

5. The information disclosure statement filed on Jun. 27, 2003, does not fully comply with the requirements of 37 CFR 1.98 because: 37 CFR 1.98(a)(2)(iii) requires legible copies of those portions of the copending U.S. applications which caused them to be listed. The examiner notes that the waiver of the

copy requirement in 37 CFR 1.98 for cited US patent applications, issued on Sep. 1, 2004, after the filing date of the IDS. Accordingly, the waiver does not appear to be applicable to the IDS filed Jun. 27, 2003.

Since the submission appears to be *bona fide*, applicants are given **ONE (1) MONTH** from the date of this notice to supply the above mentioned omissions or corrections in the information disclosure statements. The examiner notes that if applicants have a postcard receipt stating that the USPTO did receive copies of the documents, applicants should provide a copy of said receipt so that there is no ambiguity in the record that applicants did provide copies of the missing documents. NO EXTENSION OF THIS TIME LIMIT MAY BE GRANTED UNDER EITHER 37 CFR 1.136(a) OR (b). Failure to timely comply with this notice will result in the above mentioned information disclosure statement being placed in the application file with the noncomplying information **not** being considered. See 37 CFR 1.97(i).

6. The disclosure is objected to because of the following informalities:

The specification at page 58, line 16, identifies the reference characters **21**, **22**, and **23** in Fig. 10 as "gap forming

members." However, the specification at page 58, line 24, identifies the reference character **22** as a "rotating shaft."

Appropriate correction is required.

7. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

In claim 5, the recitation "a lowest angle peak at an angle of 7.3° ± 0.2°, and wherein an interval between the lowest angle peak to a next peak at a high angle side is not less than 2.0°" lacks antecedent in the specification. See page 6, lines 15-19, of the specification, which discloses "a lowest angle peak at an angle of 7.3° ± 0.2°, and has no peak at an angle of from 7.4° to 9.4° (i.e., an interval between the lowest angle peak to a next peak at a high angle side is not less than 2.0°)." The limitation recited in instant claim 5 is broader than the disclosure at page 6 because it includes intervals, besides the disclosed interval of 7.4° to 9.4°, such as 7.3° to 12°, and includes diffraction patterns that comprise diffraction peaks at angles in the region of 7.4° to 9.4°.

8. The instant specification at page 12, lines 14-21, discloses that the term "surface roughness" recited in the instant claims "means the ten point mean roughness which can be measured by a method based on JIS B0601. Specifically, the roughness is represented by the difference between the average height of the five projected portions and the average depth of the five recessed portions in a unit length."

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 9, 19, and 23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 9 is indefinite in the phrase "at least a triaryl amine structure in at least one of a main chain and a side chain" (emphasis added) because it is not clear whether the claim requires that the triaryl amine structure be present in only the main chain or in the side chain or in both chains.

Claim 19 is indefinite in the phrase "light irradiator comprises at least one of a light emitting diode and a laser diode" (emphasis added) because it is not clear whether the claim requires that the light irradiator comprise only one of the named components or both components.

Claim 23 is indefinite in the phrase "at least one of a charger . . . a light irradiator . . . and an image developer . . ." (emphasis added) because it is not clear whether the claim requires that the process cartridge comprises only one of the components or a combination of all three components.

11. In the interest of compact prosecution, the examiner has interpreted the claim language recited in instant claims 9, 19, and 23, as follows:

In claim 9, the triaryl amine structure must be present in at least one of the main chain or the side chain of the charge transport polymer.

In claim 19, the light irradiator must comprise a light emitting diode or a laser diode.

In claim 23, the process cartridge must comprise any one of the three components recited in instant claim 23.

Rejections based on these interpretations are set forth infra.

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f), or (g) prior art under 35 U.S.C. 103(a).

14. Claims 1-6, 8, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,567,559 (Yang) combined with US 6,623,899 B2 (Takaya).

Yang discloses an electrophotographic photoreceptor comprising an electroconductive substrate, an intermediate layer comprising a polyamide resin, a charge generation layer, and a charge transport layer formed on the charge generation layer using a halogen-free solvent. The charge generation layer comprises a polyvinyl butyral resin and a fine dispersion of a

titanyl phthalocyanine material having a particle size smaller than 0.3 μm. The charge transport layer is obtained by coating the charge generation layer with a coating solution comprising a binder resin, triphenylamine as the charge transport material, and the solvent toluene. The Yang charge transport layer meets the charge transport layer limitations recited in instant claims 1 and 16. The titanyl phthalocyanine exhibits an X-ray diffraction pattern having a maximum peak at a Bragg angle (2θ ± 0.2°) of 27.2°, a lowest peak at 7.4°, a peak at 9.5°, and no peak at 26.3°, when a Cu-Kα x-ray having a wavelength of 1.54 Å is used. See col. 6, lines 25-29; col. 7, lines 6-30; example 2 at col. 8, lines 29-57; and Fig. 12. The interval between the peaks at angles of 7.4° and 9.5° meet the limitation "an interval . . . is not less than 2.0°" recited in instant claim 5. The titanyl phthalocyanine material meets the compositional limitations recited in instant claims 3-6, and the particle size limitation of "not greater than 0.3 μm," recited in instant claim 2.

Instant claim 8 is written in product-by-process format. Yang does not disclose that its titanyl phthalocyanine material is obtained by the method recited in instant claim 8. However, the Yang titanyl phthalocyanine material exhibits an X-ray

diffraction spectrum that meets limitations recited in instant claims 4-6, and the particle size limitation of "not greater than 0.3 μm" recited in instant claim 2. Therefore, it appears that the titanyl phthalocyanine material disclosed by Yang is the same or substantially the same as the instantly recited titanyl phthalocyanine crystal made by the process steps recited in the instant claim. The burden is on applicants to prove otherwise. In re Marosi, 218 USPQ 289 (Fed. Cir. 1983); In re Thorpe, 227 USPQ 964 (Fed. Cir. 1985); MPEP 2113.

Yang does not exemplify an intermediate layer having a surface roughness as required in the instant claims. However, Yang does not limit the type of intermediate layer used. Col. 5, line 12.

Takaya teaches the use of a particular intermediate layer located between the charge generation layer and the electroconductive substrate of an electrophotographic photosensitive member. Takaya discloses that the intermediate layer has a layer thickness of at least 0.5 μm and comprises aggregated particles of $Al_2O_3 \cdot nH_2O$, where n is a number of at least 0 representing "a degree of hydration." Col. 3, lines 55-63. Takaya teaches that the intermediate layer preferably has a 10-point surface roughness Rz (according to JIS

B06010) of "0.1 to 1 μm so as to provide improved function of preventing the occurrence of interference fringes sometimes encountered in an electrophotographic apparatus of a digital scheme using coherent light such as laser light as exposure light." Col. 7, lines 1-8. Takaya exemplifies an intermediate layer having a 10-point surface roughness Rz of 0.5 μm. See, for example, example 1, col. 10, lines 13-27. Takaya discloses that its intermediate layer "can be formed in a crack-free state inexpensively and without requiring a special technique by using a coating liquid of a good storage stability." Col. 3, lines 34-37. According to Takaya, prior art intermediate layers comprising a polyamide resin are "liable to have an electrical resistance which is liable to change depending on environmental changes, so that it has been difficult to provide an electrophotographic photosensitive member having stable and excellent potential characteristics in all environments ranging from low temperature/low humidity to high temperature/high humidity." Col. 2, lines 14-27. Takaya discloses that photosensitive members comprising its particular intermediate layer solve the above-mentioned problems of the prior art. Col. 3, lines 27-30. Takaya discloses that such photosensitive members exhibit "excellent potential characteristic and image forming characteristic free from difficulties, such as lower

image density or black spots and fog over a variety of temperature and humidity environment conditions even at a smaller thickness of photosensitive layer." Col. 3, lines 39-46; example 1, col. 11, lines 12-19; and Table 1 at col. 13, example 1.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings in Takaya, to use the intermediate layer taught by Takaya having a 10-point surface roughness Rz of 0.5 μm as the intermediate layer in the photoreceptor disclosed by Yang, because that person would have had a reasonable expectation of successfully obtaining an electrophotographic photoreceptor that prevents the occurrence of interference fringes and exhibits excellent potential characteristics and image forming characteristics free from difficulties over a variety of temperature and humidity environment conditions, as taught by Takaya.

The combined teachings of Yang and Takaya meet the surface roughness - particle size relationships recited in instant claims 1 and 2. As discussed supra, the titanyl phthalocyanine material in the charge generation layer disclosed by Yang is dispersed as a fine dispersion having a particle size smaller than 0.3 μm. The particle size of smaller than 0.3 μm is smaller than the Takaya intermediate layer 10-point surface

roughness of 0.5 μm and is also not greater than 2/3 of the roughness of 0.5 μm (i.e., 0.33 μm), as recited in instant claims 1 and 2, respectively.

15. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yang combined with Takaya, as applied to claim 1 above, further with US 5,496,671 (Tamura).

Yang combined with Takaya renders obvious an electrophotographic photoreceptor as described in paragraph 14 above, which is incorporated herein by reference.

Yang does not disclose that the charge transport layer comprises a charge transport polymer as recited in instant claim 9. However, Yang does not limit the type of charge transport layer used. Col. 5, lines 13-14; and reference claim 22.

Tamura teaches a charge transport layer comprising a charge transport polymer comprising a triarylamine moiety in the side chain of the polymer, which meets the charge transport polymer limitation recited in instant claim 9. The charge transport layer is formed from by coating the charge generation layer with a solution comprising the carbon-carbon double bond containing triarylamine compound CTM-3, a carbon-carbon double bond-containing monomer, and toluene, and photo-setting the coating

to form the charge transport polymeric layer. CTM-3 at col. 7; synthesis example 1 at col. 42; and example 1 at col. 43, lines 15-26. The Tamura charge transport layer meets the charge transport layer limitations recited in instant claim 9. According to Tamura, an electrophotographic photoconductor comprising its charge transport layer has improved mechanical strength and high photosensitivity and durability. Col. 1, lines 57-60.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings in Tamura, to use the charge transport layer taught by Tamura as the charge transport layer in the photoreceptor rendered obvious over the combined teachings of Yang and Takaya, because that person would have had a reasonable expectation of successfully obtaining an electrophotographic photoreceptor that has improved mechanical strength and high photosensitivity and durability as taught by Tamura.

16. Claims 10-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yang combined with Takaya, as applied to claim 1 above, further combined with US 2002/0076633 A1 (Niimi'633).

Yang combined with Takaya renders obvious an electrophotographic photoreceptor as described in paragraph 14 above, which is incorporated herein by reference.

Yang does not exemplify a photoreceptor comprising a protective layer as recited in the instant claims.

Niimi'633 discloses a particular protective layer that can used as the protective layer for an electrophotographic photoreceptor. The protective layer comprises a charge transport polymer comprising a triarylamine moiety in a side chain and a particulate alumina filler having a specific resistivity of 2.5×10^{12} Ω•cm. See refining example 6 at pages 24-25, paragraphs 0346-0351; and the protective layer in example 6 at page 27, paragraph 0380. The protective layer in example 6 meets the protective layer limitations recited in instant claims 10-12 and 14.

Niimi'633 does not identify its alumina filler as an "α-alumina" as recited in instant claim 13. However, as discussed supra, the Niimi'633 alumina filler has a specific resistivity of 2.5×10^{12} Ω•cm. The instant specification discloses an "α-alumina" having a specific resistivity of 2.5×10^{12} Ω•cm. Instant specification, page 87, lines 22-23. Because the Niimi'633 alumina filler has the same specific resistivity as the "α-alumina" disclosed in the instant specification and is

used for the same purpose as a filler in a protective layer for a photoreceptor, it is reasonable to presume that the Niimi'633 alumina filler is an "α-alumina" as recited in instant claim 13. The burden is on applicants to prove otherwise. In re Fitzgerald, 205 USPQ 594 (CCPA 1980)

Accordingly to Niimi'633, a photoreceptor comprising its protective layer provides high quality images even in repeated use and has "good mechanical durability and high electrostatic durability (i.e., increase of residual potential and occurrence of blurred images can be curbed)." Page 3, paragraph 0045. The photoreceptor also has "stable photosensitive properties even when environmental conditions such as temperature and humidity change and which is resistant to reaction gases such as ozone and NOx." Page 3, paragraph 0046.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings in Niimi'633, to incorporate the protective layer taught by Niimi'633 in the photoreceptor rendered obvious over the combined teachings of Yang and Takaya, because that person would have had a reasonable expectation of successfully obtaining an electrophotographic photoreceptor that provides high quality images even in repeated use and has good mechanical durability, good electrostatic durability, "stable photosensitive properties even when

environmental conditions," and is "resistant to reaction gases such as ozone and NOx."

17. Claims 17 and 19-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2002/0051654 A1 (Niimi'654) combined with Yang and Takaya.

Niimi'654 discloses an image forming apparatus and a process cartridge that meet the apparatus and process cartridge limitations recited in the instant claims, but for the presence of the photoreceptor recited in instant claims 17 and 23. The Niimi'654 image forming apparatus comprises a photoreceptor **1**, a charger comprising a charger roller **8**, a light irradiator **10**, an image developer **11**, and a transfer device comprising a transfer belt **15**. Fig. 14, and page 17, paragraphs 0313-0320. Niimi'654 teaches that the light irradiator may be a laser diode or a light emitting diode as recited in instant claim 19. Page 17, paragraph 0318. The charger is a proximity charger wherein the gap formed between the charger roller **8** and the photoreceptor **1** is preferably from 10 to 200 μm, which meets the charger limitations recited in instant claims 20 and 21. Page 2, paragraph 0030, and page 3, paragraph 0034. Niimi'654 further discloses that when charging, the charger applies a DC voltage overlapped with an AC voltage to the photoreceptor to avoid

uneven charging, which meets the charger limitation recited in instant claim 22. Page 9, paragraph 0152; and page 26, paragraph 0472. The Niimi'654 process cartridge comprises a photoreceptor **73**, a charger **70**, an image irradiator **71**, and an image developer **75**. Fig. 16, and page 18, paragraph 0327.

Niimi'654 does not exemplify a photoreceptor as recited in the instant claims 17 and 23. However, Niimi'654 does not limit the type of photoreceptor used. Niimi'654 discloses that the photoreceptor may comprise an electroconductive substrate **31**, a charge generation layer **35**, and a charge transport layer **37**. Fig. 11, and page 9, paragraph 0155.

The combined teachings of Yang and Takaya render obvious an electrophotographic photoreceptor that meets the photoreceptor limitations recited in instant claims 17 and 23. The discussions of Yang and Takaya in paragraph 14 above are incorporated herein by reference. In addition, Yang discloses that an electrophotographic photoreceptor comprising a charge generation layer that comprises its particular titanyl phthalocyanine material "exhibits excellent photosensitivity in the near-infrared wavelength range and maintains persistent optoelectronic response without deterioration of sensitivity in repeated use." Yang, col. 3, lines 48-60.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings in Yang and Takaya, to use the electrophotographic photoreceptor rendered obvious over the combined teachings of Yang and Takaya, as the photoreceptor in the image forming apparatus and process cartridge disclosed by Niimi'654, because that person would have had a reasonable expectation of successfully obtaining an image forming apparatus and a process cartridge that have excellent photosensitivity in the near-infrared wavelength range and that maintain "persistent optoelectronic response without deterioration of sensitivity in repeated use" as disclosed by Yang. Such an image forming apparatus and process cartridge would also be expected to prevent the occurrence of interference fringes and exhibit excellent potential characteristics and image forming characteristics free from difficulties over a variety of temperature and humidity environment conditions, as taught by Takaya.

18. Claims 1-3, 7, 10-14, 16-20, 22, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Niimi'633 combined with US 6,268,096 B1 (Nukada) and Takaya.

Niimi'633 discloses an electrophotographic photoreceptor comprising an electroconductive substrate; an undercoat layer; a

charge generation layer; a charge transport layer formed on the charge generation layer using a halogen-free solvent; and a protective layer. The charge generation layer comprises a polyvinyl butyral resin and a bisazo charge generation material. The charge transport layer is obtained by coating the charge generation layer with a coating solution comprising a binder resin, a charge transport compound, and the solvent tetrahydrofuran. The protective layer comprises a charge transport polymer comprising a triarylamine moiety in a side chain and a particulate alumina filler having a specific resistivity of 2.5×10^{12} Ω•cm. See refining example 6 at pages 24-25, paragraphs 0346-0351; pages 25-26, paragraphs 0358 to 0367; and example 6 at page 27, paragraphs 0380-0381. The Niimi'633 charge transport layer meets the charge transport layer limitations recited in instant claims 1 and 16. The protective layer in example 6 meets the protective layer limitations recited in instant claims 10-12 and 14.

Niimi'633 does not identify its alumina filler as an "α-alumina" as recited in instant claim 13. However, as discussed supra, the Niimi'633 alumina filler has a specific resistivity of 2.5×10^{12} Ω•cm. The instant specification discloses an "α-alumina" having a specific resistivity of 2.5×10^{12} Ω•cm. Instant specification, page 87, lines 22-23. Because the

Niimi'633 alumina filler has the same specific resistivity as the "α-alumina" disclosed in the instant specification and is used for the same purpose as a filler in a protective layer for a photoreceptor, it is reasonable to presume that the Niimi'633 alumina filler is an "α-alumina" as recited in instant claim 13. The burden is on applicants to prove otherwise. Fitzgerald, supra.

Niimi'633 further discloses that its photoreceptor may be used as the photoreceptor in an image forming apparatus or a process cartridge. The image forming apparatus comprises at least one image forming unit, which comprises a photoreceptor **1**, a charger **8**, a light irradiator **5**, an image developer **11**, and a transfer device **15**. Page 4, paragraph 0061; Fig. 3; and page 21, paragraphs 0300-0305. Niimi'633 teaches that the light irradiator is preferably a laser diode or a light emitting diode as recited in instant claim 19, and the charger is preferably a contract charger or a proximity charger as recited in instant claims 20 and 22. Page 4, paragraph 0062; and page 21, paragraph 0304. Niimi'633 further teaches that the image forming apparatus can comprise a plurality of image forming units. See Fig. 7, and pages 22-23, paragraphs 0321-0324. The Niimi'633 process cartridge comprises a photoreceptor **43**, and at least one of a charger **40**, an image irradiator **41**, or an image

developer **45**. Page 5, paragraph 0063; Fig. 5; and page 22, paragraph 0319.

Niimi'633 does not exemplify a charge generation layer comprising a charge generation material having an average particle diameter as recited in the instant claims. However, Niima'633 discloses that the charge generation material in the charge transport layer can equally be a phthalocyanine pigment. Page 10, paragraph 0151, line 1-2.

Nukada teaches a titanyl phthalocyanine crystal that exhibits an X-ray diffraction pattern having a maximum peak at a Bragg angle (2θ ± 0.2°) of 27.3°. The titanyl phthalocyanine crystal comprises uniform particles having an ellipsoidal tabular form, which have a primary particle diameter of 0.05 to 0.08 μm and a BET specific surface area of 45 m^2/g. Example 1 at col. 7, and Fig. 1. The titanyl phthalocyanine crystal meets the compositional limitations recited in instant claim 3, and the average particle size limitation of not greater than 0.3 μm recited in instant claim 2. Nukada further discloses a charge generating layer where the layer is formed by coating a coating solution comprising a polyvinyl butyral binder resin, the titanyl phthalocyanine crystal of example 1, and a solvent. Col. 9, lines 39-44. Accordingly to Nukada, when a photoreceptor comprises a charge generation layer comprising its

titanyl phthalocyanine crystal, the photoreceptor has excellent photosensitivity, stability, and durability. Col. 1, lines 60-63; col. 4, lines 44-46; and col. 12, lines 13-26.

Instant claim 7 is written in product-by-process format. Nukada does not disclose that its charge generation layer is formed by the method recited in the instant claim 7. However, as discussed above, the Nukada titanyl phthalocyanine crystal comprises particles having a primary particle diameter of 0.05 to 0.08 μm. The primary particle diameters of 0.05 to 0.08 μm meet the average particle size limitation of "not greater than 0.3 μm" recited in instant claim 7. Because the Nukada primary particle diameters of 0.05 to 0.08 μm are much smaller than the average particle size limitation of not greater than 0.3 μm recited in instant claim 7, it is reasonable to conclude that the Nukada titanyl phthalocyanine crystal meets the particle size standard deviation of "not greater than 0.2 μm" recited in instant claim 7. Thus, it appears that the charge generation layer disclosed by Nukada is the same or substantially the same as the instantly recited charge generation layer made by the process recited in instant claim 7. The burden is on applicants to prove otherwise. Marosi, supra; Thorpe; supra; MPEP 2113.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of Nukada, to use the charge generation layer coating solution taught by Nukada to form the charge generation layer in the photoreceptor disclosed by Niimi'633, and to use the resultant photoreceptor in the image forming apparatus and process cartridge disclosed by Niimi'633. That person would have had a reasonable expectation of successfully obtaining an electrophotographic photoreceptor, an image forming apparatus, and a process cartridge that have excellent photosensitivity, stability, and durability.

Niimi'633 also does not exemplify a photoreceptor comprising an undercoat layer having the surface roughness as recited in the instant claims. However, Niimi'633 does not limit the type of undercoat layer used. Page 12, paragraph 0180; and reference claim 22.

Takaya teaches the benefits of using of a particular undercoat layer located between the charge generation layer and the electroconductive substrate of an electrophotographic photosensitive member, which has a 10-point surface roughness Rz of 0.5 μm. The discussion of Takaya in paragraph 14 above is incorporated herein by reference.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings in Takaya, to use the

undercoat layer taught by Takaya having a 10-point surface roughness Rz of 0.5 μm as the undercoat layer in the photoreceptor rendered obvious over the combined teachings of Niimi'633 and Nukada, and use the resultant photoreceptor in the image forming apparatus and process cartridge rendered obvious over the combined teachings of Niimi'633 and Nukada. That person would have had a reasonable expectation of successfully obtaining an electrophotographic photoreceptor, an image forming apparatus, and a process cartridge that prevent the occurrence of interference fringes and exhibit excellent potential characteristics and image forming characteristics free from difficulties over a variety of temperature and humidity environment conditions as disclosed by Takaya.

The combined teachings of Niimi'633, Nukada, and Takaya meet the surface roughness - particle size relationships recited in instant claims 1 and 2. As discussed supra, the titanyl phthalocyanine crystal particles in the charge generation layer taught by Nukada have primary particle diameters of 0.05 to 0.08 μm. The primary particle diameters of 0.05 to 0.08 μm are smaller than the Takaya undercoat layer 10-point surface roughness of 0.5 μm and are also not greater than 2/3 of the

roughness of 0.5 μm (i.e., 0.33 μm), as recited in instant claims 1 and 2, respectively.

19. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

20. Claims 1-23 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-18 and 20-27 of copending Application No. 10/804,067 (Application'067). This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Although the conflicting claims are not identical, they are not patentably distinct from each other because the subject matter recited in the claims of Application'067 renders the subject matter recited in the instant claims obvious.

Reference claims 2 and 3, which each depend directly from reference claim 1, recite an electrophotographic photoconductor comprising an electroconductive substrate, a charge generation layer, and a charge transport layer formed on the charge generation layer using a halogen-free solvent. The charge generation layer comprises a particular polyvinyl acetal resin and a charge generation material that has an average particle diameter smaller than the "surface roughness plane," where the plane is the electroconductive substrate or an interlayer disposed between the substrate and the charge generation layer, recited in reference claims 2 and 3, respectively. The "surface roughness plane" has the same meaning as "surface roughness" recited in the instant claims. Compare paragraph 8 above and Application'067, page 3, paragraph 0052. The photoconductor recited in reference claims 2 and 3 meets the photoreceptor limitations recited in instant claim 1. Reference claim 4, which depends on reference claim 1, requires that the average particle diameter of the charge generation material be 0.3 μm or less and two-thirds or less than the surface roughness of the plane, which meets the particle size limitations recited in instant claim 2. The subject matter recited in reference claims 5-18, which depend from reference claim 1, meets the titanyl phthalocyanine, the process limitation, the charge

polymer, the surface protective layer, the substrate, and non-halogenated solvent limitations recited in instant claims 3-16, respectively. References 20 and 22-26 recite an image forming apparatus comprising an image forming unit that comprises a charging unit, a light-irradiating unit, a developing unit, and a transferring unit that meet the charging, light-irradiating unit, developing unit, and transporting unit limitations recited in instant claims 17 and 19-22. Reference 21, which depends on reference claim 20, further requires that the image forming apparatus comprise a plurality of image forming units that meets the apparatus limitation recited in instant claim 18. Reference claim 27 recites a process cartridge comprising at least one of charging unit, a light-irradiating unit, and a developing unit that meet the units limitations recited in instant claim 27. The apparatus and the process cartridge recited in the claims of Application'067 both comprise a photoconductor as recited in reference claim 1.

It would have been obvious for a person having ordinary skill in the art, in view of the subject matter recited in the claims of Application'067, to make and use an electrophotographic photoconductor that meets the photoreceptor limitations recited in the instant claims, and to use the resultant photoconductor in the imaging apparatus and process

cartridge recited in Application'067, because that person would have had a reasonable expectation of successfully obtaining an electrophotographic photoconductor, an imaging apparatus, and a process cartridge that could be used successfully in an electrophotographic process to form toner images.

21. Claims 1-23 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-35 of copending Application No. 10/665,155 (Application'155) in view of Takaya and US 4,734,348 (Suzuki).

This is a provisional obviousness-type double patenting rejection.

Reference claim 33, which depends from reference claim 31, which in turn depends from reference claim 21, recites an electrophotographic photoreceptor comprising an electroconductive substrate, a charge generation layer, and a charge transport layer formed on the charge generation layer using the halogen-free solvent of cyclic ethers or aromatic hydrocarbons. The charge transport layer meets the charge transport layer limitations recited in instant claims 1 and 16. The charge generation layer comprises titanyl phthalocyanine crystals that exhibit a X-ray diffraction pattern that meets the

X-ray diffraction pattern recited in instant claims 4 and 5. Reference claim 22, which depends on reference claim 21, requires the X-ray diffraction pattern to comprise no peak at a Bragg angle of 26.3°, which meets the X-ray diffraction pattern limitation recited in instant claim 6. Reference claim 23, which depends from reference claim 21, requires that the titanyl phthalocyanine crystals have an average primary particle size of less than 0.3 μm, which is within the particle size limitation recited in instant claim 2. The subject matter recited in references claim 24 and 25, which depend from reference claim 21, meets the titanyl phthalocyanine and the process limitations recited in instant claims 7 and 8. Reference claim 26, which depends from reference claim 21, requires that the charge transport layer comprise a charge polymer that meets the charge transport polymer limitations recited in instant claim 9. Reference claims 27-31, which depend from reference claim 21, require that the photoreceptor further comprise a protective layer that meets the surface protective layer limitations recited in instant claims 10-14. Reference claim 34, which depends on reference claim 21, requires that the conductive substrate comprise an oxide film formed by anodizing. The anodized oxide film meets the substrate limitation recited in instant claim 15.

References 1 and 18-20 recite an image forming apparatus comprising an image forming unit comprising a photoreceptor, a charging unit, a light-irradiating unit, a developing unit, and a transferring unit that meet the charging, light-irradiating unit, developing unit, and transporting unit limitations recited in instant claims 17 and 19-22. Reference claim 17, which depends on reference claim 1, further requires that the image forming apparatus comprise a plurality of image forming units that meets the apparatus limitation recited in instant claim 18. Reference claim 35, which depends from reference claim 1, further requires that the apparatus comprise a detachable cartridge comprising the photoreceptor and a member selected from the group consisting of chargers, irradiators, and developers that meet the units limitations recited in instant claim 23. The apparatus and process cartridge recited in the reference claims 1 and 35 comprise a photoreceptor comprising an electroconductive substrate, a charge generation layer, and a charge transport layer. The charge generation layer comprises titanyl phthalocyanine crystals. Reference claim 5, which depends from reference claim 1, requires that the titanyl phthalocyanine crystals have an average primary particle size of less than 0.3 μm, which is within the particle size limitation recited in instant claim 2. Reference claim 14, which depends

on reference claim 1, requires that the charge transport layer be formed with a non-halide solvent that meets the charge transport layer limitation recited in instant claims 17 and 23.

The reference claims do not recite the presence of an intermediate layer located between the electroconductive substrate and the charge generation layer having a surface roughness as recited in the instant claims.

Takaya teaches the benefits of using of a particular intermediate layer located between the charge generation layer and the electroconductive substrate of an electrophotographic photosensitive member, which has a 10-point surface roughness Rz of 0.5 μm. The discussion of Takaya in paragraph 14 above is incorporated herein by reference.

It would have been obvious for a person having ordinary skill in the art, in view of the subject matter recited in the reference claims in Application'155 and the teachings in Takaya, to use the intermediate layer taught by Takaya having a 10-point surface roughness Rz of 0.5 μm between the electroconductive substrate and the charge generation layer in the photoreceptor recited in the reference claims of Application'155, wherein the titanyl phthalocyanine crystals have an average primary particle size of less than 0.3 μm, and the charge transport layer is formed from a non-halide solvent. That person would have had a

reasonable expectation of successfully obtaining an electrophotographic photoreceptor, an image forming apparatus, and a process cartridge that prevent the occurrence of interference fringes and exhibit excellent potential characteristics and image forming characteristics free from difficulties over a variety of temperature and humidity environment conditions as disclosed by Takaya.

The reference claims also do not recite that the charge generation layer comprises a polyvinyl acetal binder resin.

Suzuki discloses a polyvinyl acetal resin that meets the limitations recited in instant claims 1, 17, and 23. See Example 11 at col. 13. Suzuki discloses that polyvinyl acetal resin can be used as the binder resin in a single photosensitive layer or in a charge generation layer. Col. 4, lines 10-13. Suzuki discloses that said polyvinyl acetal resin provides photosensitive layers having stably dispersed photoconductive particles and excellent electric properties, such as high sensitivity and low residual potential. Col. 2, lines 10-15, and col. 11, lines 56-60.

It would have been obvious for a person having ordinary skill in the art, in view of subject matter recited in the reference claims of Application'155 and the teachings of Suzuki, to use the Suzuki polyvinyl acetal resin as the binder resin in

the charge generation layer in the photoreceptor rendered obvious over the subject matter recited in the reference claims of Application'155 combined with the teachings of Takaya, because that person would have had a reasonable expectation of successfully obtaining a stable titanyl phthalocyanine dispersion and a photoreceptor, an image forming apparatus, and a process cartridge that have excellent electric properties, such as high sensitivity and low residual potential, as disclosed by Suzuki.

The subject matter recited in the reference claims of Application'155 combined with the teachings of Takaya and Suzuki meet the surface roughness - particle size relationships recited in instant claims 1 and 2. As discussed supra, the titanyl phthalocyanine crystal particles in the charge generation layer recited in the reference claims of Application'155 have an average primary particle diameter of less than 0.3 μm. The average primary particle diameter of less than 0.3 μm is smaller than the Takaya undercoat layer 10-point surface roughness of 0.5 μm and is also not greater than 2/3 of the roughness of 0.5 μm (i.e., 0.33 μm), as recited in instant claims 1 and 2, respectively.

22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Janis L. Dote whose telephone number is (571) 272-1382. The examiner can normally be reached Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Mark Huff, can be reached on (571) 272-1385. The central fax phone number is (703) 872-9306.

Any inquiry regarding papers not received regarding this communication or earlier communications should be directed to Supervisory Application Examiner Ms. Claudia Sullivan, whose telephone number is (571) 272-1052.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JLD
Jan. 21, 2005

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